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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,430	11/14/2003	Craig Hansen	43876-148	9134
20277	7590	03/10/2006	EXAMINER	
MCDERMOTT WILL & EMERY LLP			COLEMAN, ERIC	
600 13TH STREET, N.W.			ART UNIT	
WASHINGTON, DC 20005-3096			PAPER NUMBER	
			2183	

DATE MAILED: 03/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/712,430

Applicant(s)

HANSEN ET AL.

Examiner

Eric Coleman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 14-39 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 14-39 are directed to a computer readable medium having instructions that cause a computer to perform operations. Claims 27-39 are directed to a computer data signal embodied in a transmission medium the computer data signal having instructions that cause a computer to perform operations. These claims are directed to a medium or signal. The instructions are not stored on a tangible medium and therefore are the medium itself and therefore are not tangible. The instructions are not embodied in a manner so as to be tangible. The instructions are merely portions of a medium or signal and these are not embodied so as to be tangible. Therefore the claims are not statutory.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. Claims 1-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Hook (Patent No. 6,266,758) in view of Motorola MC68030 users manual (hereafter referred to as Motorola).

Van Hook taught the invention substantially as claimed including a data processing ("DP") system comprising( as per claims 1,14,27):

- a) Instruction path (e.g, see fig. 3 and col. 6, lines 25-33)
- b) Data path (300,318)(e.g., see fig. 3);
- c) External interface (vector load/store unit) (302) operable to receive data from an external source and communicate the received data over the data path (e.g., see figs. 3,4)and bus coupling components to the data processing system (206)(e.g., see fig. 2);
- d) External memory (Main memory) (e.g., see fig. 3) and Data storage (212), RAM (210) (e.g., see fig. 2) coupled to the bus e.g., see fig. 3) (bus to main memory);
- e) Register file (204, 304) (e.g., see figs. 2,3);
- f) Execution unit (SIMD vector unit) (e.g., see fig. 3)that performs shift of data of differing widths (in registers that have a width) in response to shift instructions The registers have an elemental width smaller that the register width , the number of data elements in the plurality of data elements is inversely related to the elemental width (e.g., see figs. 8a, 8b,8c,8d,8e,8f,,8g,8h and col. 9, line 55-col. 11, line 58)
- g) Shifting data by a shift amount and providing a concatenated result (e.g., see figs. 8a, 8b,8c,8d,8e,8f,,8g,8h and col. 9, line 55-col. 11, line 58).

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3. Van Hook did not expressly detail the shifting instruction (shuffle instruction)(e.g., see col. 13, line 28-col. 14, line 54) specified the shifting amount. Motorola However taught shift instructions that a field that contains a shift count field and register field indicating register to be shifted(e.g., see page 3-33 in instruction format and instruction fields portions).
4. It would have been obvious to one of ordinary skill in the art to combine the teachings of Van Hook and Motorola. Both references were directed toward the problems of implementing instructions including instructions that shift data in registers or memory locations. One of ordinary skill would have been motivated to incorporate the Motorola teachings of using a shift count field or placing the shift count in a specified register to allow the combined system to flexible alter the shift amount.
5. As to the shift amount in the combined system it would have been obvious to one of ordinary skill considering the shift count and size of the operation as taught by Motorola and the shifting of elemental portions as taught by Van Hook then in the combined system the shift amount would have been configurable to amount to inclusively between zero and one less than the elemental width. Further as to the limitation that the instructions are decoded this is a conventional feature of standard processors at the time of the claimed invention to allow the user to use computer languages that use words and letters instead just numbers . Since the instructions in Van Hook and Motorola were ones that used words in the instructions then one of ordinary skill would have been motivated to decode instructions for use in the Van Hook and Motorola system.

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6. Van Hook did not expressly detail a cache memory. However since Van Hook taught a system that retrieved data and instructions from main memory which is characteristically a slow memory one ordinary skill would have been motivated to incorporate a cache to store data and instructions ahead of the time needed to provided quicker access to data and instruction as was well known in the art at the time of the claimed invention.

7. Van Hook did not specifically detail virtual memory addressing unit. Van Hook however taught single instruction multiple data processing (e.g., see col. 4, lines 28-35). Therefore it would have been obvious to one of ordinary skill in the DP art to provide a virtual memory addressing unit at least to address plural corresponding data locations in plural portions of memory for use in SIMD processing such a when performing the same operation of separate portions of graphics data for display.

8. As per claim 2, 15,28, Van Hook taught a concatenated result is provided to a register (e.g., see figs. 4,8a, 8b, 8c, 8d, 8e, 8f, 8g, 8h and col. 9, line 55-col. 11, line 58).

9. As per claim 3,16,29 Motorola taught the shift amount is contained in a register specified by the instruction (e.g., see page 3-33 in instruction format and instruction fields portions).

10. As per claim 4,17,30 Motorola taught the shift amount is contained in an immediate field of the instruction (e.g., see page 3-33 in instruction format and instruction fields portions).

11. As per claim 5,6,18,19,31,32 Motorola taught the data element has a sign bit in a most significant position and wherein the execution unit is further operable to fill a shift

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amount number of most significant bits in each of the second plurality of data elements with the sign bit from a respective data element in the first plurality of data elements (e.g., see page 3-32). Van Hook taught filling with the sign bit the space for each data element shifted data word by the amount shifted (e.g., see fig. 8c,8d). Therefore one of ordinary skill considering the teachings of Motorola and the Van Hook teachings of elemental portions of data within the data word that are shifted would have been motivated to provide the shifting and of the filling of the sign bits for each data element. This filling of the sign bit would have been with a ones or a zeros depending on the sign of the data (e.g, see figs. 8c,8d of Van Hook).

12. As per claim 7,20,33, Van taught shifting data in plural data elements from one register and storing the shifted data into an additional register (e.g., see figs. 4,8a, 8b, 8c, 8d, 8e, 8f,8g, 8h and col. 9, line 55-col. 11, line 58). Motorola taught shifting by a shift count and filling the one end of the data element. Therefore one of ordinary skill considering the teachings of Van Hook and Motorola would have been motivated to fill a shift amount number of bits in each of the second plurality of data elements with a subfield from a respective location of an additional register (e.g., see figs. 8c,8d of Van Hook).

13. As per claims 8,9,10,21,22,23,34,35,36, It was well known in the art that standard processors at the time of the claimed invention standard operated on larger word widths as memories became larger which allow the system to address larger numbers of locations of data in memory and this is increase by a multiple of 2. Also with the motivation of using increased word widths one of ordinary skill would have been

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able to take advantage of the larger word widths of memory. Therefore one of ordinary skill would have been motivated to use operate on 128 bit width data as the memories that could hold the corresponding number locations were available and/or had larger width locations. Also, since Van Hook taught 64 bit data and Motorola taught (e.g., see page 3-33 in instruction format and instruction fields portions) byte, Word and long operations the one of ordinary skill would have motivated provide for the use of 32 bit and 16 bit data.

14. As per claim 11,24,37, Van Hook taught an elemental width of each the second plurality of data elements being equal to the elemental width of each of the first plurality of data elements (e.g., see fig. 8a, 8b, 8e, 8f, 8g, 8h).

15. As per claim 12, 25,38 Van Hook taught the elemental width of each of the second plurality of data elements being equal to twice the elemental width of each of the first plurality of data elements (e.g., see figs. 8c, 8d).

16. As to the limitation of claim 13,39 Van Hook and Motorola did not expressly detail that the elemental width of each of the second plurality of data elements was equal to half the elemental width of each of the first plurality of data elements. However one of ordinary skill would have been motivated to send data of one size to an other as data of half the size at least to compress the data and save memory space. On the other hand when the precision of the data was double precision and the operation was single precision operation one of ordinary skill would have been motivated to convert the data to half the size. Also since van Hook taught expanding from one size to twice the size of



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an operand by filling with the sign bit (e.g., see figs 8c, 8d) one of ordinary skill would have been motivated to convert the data back to half the size of the expanded data.

**Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Song disclosed a scalable width vector processor (e.g. see abstract).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Coleman whose telephone number is (571) 272-4163. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EC

  
**ERIC COLEMAN**  
**PRIMARY EXAMINER**